

WHAT IS CLAIMED IS:

1. A rubber modified polymer comprising
 - a) a matrix polymer comprising a polymerized vinyl aromatic monomer, and
 - b) a grafted rubber, dispersed within the matrix polymer in the form of discrete rubber particles containing occluded matrix polymer therein, wherein the grafted rubber is characterized by:
 - i) a degree of grafting of from 30 to 100 percent at the point of phase inversion,
 - ii) an amount of matrix polymer grafted to the rubber of from 20 to 75 weight percent of the total amount of matrix polymer, andwherein, the grafted rubber is produced by reacting the matrix polymer with a functionalized rubber having at least 1 functional group per molecule, wherein the functional group is capable of reacting with the matrix polymer under polymerization conditions, thus grafting the matrix polymer to the rubber.
2. The rubber modified polymer of Claim 1, wherein the functionalized rubber is a functionalized conjugated diene polymer rubber.
3. The rubber modified polymer of Claim 1, wherein the functionalized rubber is a functionalized polybutadiene rubber.
4. The rubber modified polymer of Claim 1, wherein the functionalized rubber contains a functional group selected from the group consisting of maleates; acrylates, (alkyl)acrylates; fumarates, itaconate, citraconate, vinyl ether, vinyl ester, cinnamate, maleimides and derivatives thereof.
5. The rubber modified polymer of Claim 1, wherein the functionalized rubber is maleated polybutadiene rubber or methacrylated polybutadiene rubber.
6. The rubber modified polymer of Claim 1, wherein the vinyl aromatic monomer is styrene.
7. The rubber modified polymer of Claim 1, wherein the polymer matrix comprises styrene-acrylonitrile copolymer.
8. The rubber modified polymer of Claim 1, wherein the grafted rubber comprises at least 50 weight percent of a grafted functionalized rubber.

9. A process for producing a rubber modified polymer comprising a matrix polymer having dispersed discrete rubber particles containing occlusions of matrix polymer therein, wherein the process comprises:

5 a) polymerizing a vinyl aromatic monomer in the presence of a functionalized rubber containing a functionality which is capable of reacting with the matrix polymer, such that at least 30 percent of the functionalized rubber is grafted with matrix polymer at the point of phase inversion.

10 10. The process of Claim 9, wherein the functionalized rubber is a functionalized conjugated diene polymer rubber.

11. The process of Claim 10, wherein the functionalized rubber is a functionalized polybutadiene rubber.

15 12. The process of Claim 9, wherein the functionalized rubber contains a functional group selected from the group consisting of maleates; acrylates, (alkyl)acrylates; fumarates, itaconate, citraconate, vinyl ether, vinyl ester, cinnamate, maleimides and derivatives thereof.

13. The process of Claim 9, wherein the functionalized rubber is maleated polybutadiene rubber or methacrylated polybutadiene rubber.

14. The process of Claim 9, wherein the vinyl aromatic monomer is styrene.

20 15. The process of Claim 9, wherein the matrix polymer comprises a styrene-acrylonitrile copolymer.

16. The process of Claim 9, wherein the grafted rubber comprises at least 50 weight percent of a grafted functionalized rubber.